

# Poultry & Livestock Mortality Disposal in Iowa

## Frequently Asked Questions (FAQ's)

According to recent USDA statistics, Iowa ranks # 1 in the U.S. in hog & pig inventories (16,300,000), #1 in laying hens (52,147,000), # 7th in beef cattle and calves (3,800,000), and 12th in milk cows (200,000).

With such large poultry and livestock populations, safe disposal of normal daily mortalities is a formidable task. Typical mortality rates in the swine industry (20% pre-wean, 2% nursery and finishing, and 3% annually for breeding stock), for example, result in approximately 5 lbs of mortality for each hog marketed. In Iowa, where approximately 25,000,000 hogs go to market each year, this means that roughly 125,000,000 lbs of mortality were produced and disposed of at various point in the production cycle (some of this outside of Iowa).

In addition to normal daily losses, those caused by disease outbreaks and accidents, such as fires and livestock building ventilation failures, make emergency disposal of large numbers of carcasses an equally important concern.

The following "Frequently Asked Questions (FAQ's)" provide poultry and livestock producers, veterinarians, environmental officials, and others with information and answers to common questions regarding environmentally sound and bio-secure disposal options suitable for normal and emergency mortality disposal situations.

To help make information regarding specific questions easy to find, the questions are grouped by method of disposal (rendering, on-farm burial, on-farm incineration, and on-farm composting) AND also by disposal situation (normal daily disposal, emergency-non-disease related, and emergency-disease related). (NOTE: If you are viewing this document as an Adobe PDF file on your computer, you can use the search capability of the Adobe Acrobat viewer to help you quickly locate sections of this document that address particular topics.)

## Matching Disposal Method to the Situation

***Routine Mortality Disposal*** (normal daily mortalities, not resulting from an emergency)

[Which disposal options are allowed for disposal of normal daily livestock and poultry mortalities in Iowa?](#)

In addition to off-farm disposal by a licensed rendering firm, Iowa regulations permit on-farm disposal via burial, incineration in a closed vessel, or composting. Each method has certain regulatory or practical limitations, refer to the specific FAQ section for each method for further information.

**Emergency Disposal - Non-Disease** (mortalities caused by a catastrophic event such as fire, flood, ventilation failure, poisoning, or other causes that are not disease-related)

Which disposal options are allowed in Iowa for disposal of poultry or livestock killed by non-disease-related emergencies?

Mortalities caused by non-disease emergencies can be disposed of using the same options (rendering, burial, incineration, composting) allowed for routine disposal.

Animal mortalities from a catastrophic event shall not be composted until the Iowa Department of Natural Resources (Iowa DNR) field office having jurisdiction is contacted, and approval for emergency composting operations is received. Similarly, emergency burial of catastrophic mortalities requires prior approval by the Iowa DNR. Emergency contact information for the Iowa DNR is given at the end of this document.

**Emergency Disposal - Disease** (mortalities caused by communicable and non-communicable diseases)

Which disposal options are allowed for disposal of poultry or livestock that have died from a contagious disease or that have been euthanized following exposure to a contagious disease?

Farm animals known or suspected to have died from an infectious disease that can be spread by scavengers or insects, or that died from a reportable disease, must be disposed of in accordance with the requirements of both the Iowa Department of Agriculture and Land Stewardship (IDALS) and the Iowa Department of Natural Resources. Emergency contact information for these agencies is given at the end of this document.

Iowa Department of Agriculture & Land Stewardship rules apply to mortalities caused by three specific diseases:

**Anthrax** - carcasses of animals that have died due to anthrax, or that have been killed on account of being infected with anthrax, must be burned within 24 hours, intact without removal of the hide, together with all contaminated flooring, mangers, feed racks, watering troughs, buckets, bedding, litter, soil and utensils.

**Cholera** - carcasses of hogs dead of cholera must be burned within 24 hours intact, or they may be disposed of within 24 hours by the operator of a licensed rendering plant.

**Non-communicable Diseases** - carcasses of animals, dead from non-communicable diseases, may be either burned within 24 hours, or such carcasses may be disposed of within 24 hours by the operator of a licensed rendering plant.

## Considerations for Specific Disposal Methods

### Rendering

How many rendering plants are located in Iowa and how can they be contacted?

Iowa is fortunate to have 4 major plants within the state (and 2 located near Iowa in Eastern Nebraska, and Southern Minnesota). Their locations and phone numbers are shown in the following table.

Name	Address	City	County	Phone
Darling International	1900 Murray St.	Sioux City, IA	Woodbury	712-258-7524
Simonsen Industries	6141 Simonsen Rd.	Quimby, IA	Cherokee	712-445-5542
Darling International	1423 Beaver Channel Parkway	Clinton, IA	Clinton	563-242-9200
Darling International	601 SE 18th St.	Des Moines, IA	Polk	515-265-0381
Darling International	14401 S 5 <sup>th</sup> St.	Bellevue, NE		402-291-8800
Darling International	9000 382 <sup>nd</sup> Ave.	Blue Earth, MN		507-526-3296

Rendering service bills continue to increase. How do rendering fees compare with the costs of on-farm disposal methods?

Increases in transportation costs and declining markets for certain types of rendered products have resulted in increasing rendering fees over the years. Nevertheless, a survey of swine producers in Iowa conducted in 2001 by Iowa State University (ISU) and the Iowa Pork Producers Association (IPPA) showed that rendering was the most widely used disposal method and, that if all costs (capital costs; labor; fuel; equipment maintenance, repair, depreciation; etc.) are counted, rendering was typically less costly than on-farm disposal methods. These data are only applicable to swine operations. Similar surveys have not been done in the cattle or poultry industries in Iowa.

If the 2001 swine mortality disposal survey conducted by Iowa State University and the Iowa Pork Producers Association showed that rendering service is less costly than composting, burial, or incineration, why do producers use on-farm disposal methods?

Producers use on-farm disposal for a variety of reasons including:

- Land, labor, and material costs of on-farm disposal are often lumped with the costs of other farming operations and hence appear to be lower than rendering bills which must be paid on a regular basis.
- Producer dissatisfaction with rendering service delays and the problems they cause during warm weather.
- Perceived bio-security hazards associated with rendering trucks moving from farm-to-farm.
- Adverse public reaction to carcasses placed near the public right-of-way for rendering service pickup.

Are there any recommended management practices associated with rendering?

The best management practices for rendering include:

- Avoid odor and insect problems by calling promptly or arranging for more frequent rendering service pickups during warm weather;
- Reduce disease transmission potential by locating the rendering truck pickup point away from livestock production facilities;
- Screen carcass pickup points from public view and fence them to restrict access by scavengers;
- Clean up any residual biological materials around the carcass pickup point that will attract flies or create odors.

## ***Burial***

**NOTE: Due to the potential for mass burial to cause serious soil and water pollution, emergency burial of catastrophic mortalities requires prior approval by the Iowa DNR. The Iowa DNR 24-hour emergency phone number is: 515/281-8694.**

Are there limitations on the size of burial area needed for a certain number (or weight) of carcasses?

IOWA DNR rules (IAC 567-100) for normal daily mortality disposal limit on-farm burial to maximum loading rates of 7 cattle, 44 swine, 73 sheep or lambs, or 400 poultry carcasses on any given acre per year. All other species are limited to 2 carcasses per acre. Animals that die within two months of birth may be buried without regard to number. Following emergencies resulting in large numbers of animal deaths, higher loading rates are permitted by Iowa DNR on a case-by-case basis if local geology and other conditions are such that local water resources will not be seriously impaired. Contact Iowa DNR for a ruling on emergency burial sites before proceeding with disposal.

What are the rules concerning drainage conditions at burial locations?

Iowa DNR rules specify that dead animals can only be buried in soils rated by Soil Conservation Service maps as being moderately well drained, well drained, somewhat excessively drained, or excessively drained soils. Other soils may be used if artificial drainage is installed to keep water table depths at least two feet below the burial depth.

What are the environmental risks associated with animal burial? Why is there so much concern about per acre burial rates and selection of sites for emergency burial?

One of the key pollution concerns associated with burial is the large amount of nitrogen contained in animal carcasses. Regardless of species, one thousand pounds of carcasses contains about 20 pounds of nitrogen that will be released into the soil as carcasses decay. When large numbers of animals are buried in a small area, as is often the case during emergency burial, the amount of nitrogen in the carcasses can be equivalent to application rates of 20,000 – 30,000

pounds of N per acre. This large amount of N, which is more than 100 times agronomic rates, can pose a significant risk to shallow groundwater, and nearby streams or wells.

If I decide to bury a large mass of animal carcasses on my property following a livestock emergency, will there be any additional requirements other than burial site approval by Iowa DNR?

The Iowa DNR will require that at least two groundwater monitoring wells be installed near the burial site, and that the drilling company submit a completion report to Iowa DNR providing drilling records and construction details for the wells. The monitoring wells will need to be sampled quarterly and tested for •nitrate-nitrogen, ammonia-nitrogen, organic-nitrogen, chloride, dissolved phosphorus, total organic carbon, and fecal coliform bacteria.

Due to the potential long-term environmental consequences of the burial site, you also will be required to file an affidavit with the county assessor documenting the existence of the site on the deed to your property.

Is there any way I can determine if there are areas on my land that may NOT be approved for mass burial of poultry or livestock in the event of an emergency?

Yes, based on geologic and other environmental databases the Iowa DNR has developed a livestock burial zone map for Iowa that will be used by its staff whenever they are asked to approve an emergency burial site. The map, which can be viewed on the world wide web, shows zones (reddish color) in Iowa where steep slopes, high water tables, shallow bedrock, wetlands, and other limitations are likely to limit use of mass burial. The interactive map can be viewed on the Iowa DNR Interactive Mapping website located at:

<http://csbweb.igsb.uiowa.edu/imgate/introduction/home.asp>

Click on the “Livestock Burial Zones” link to open the burial zones map. If necessary, click on the website “help” link at the top of the burial zones map for further directions.

Will the Iowa DNR web-based burial zone map also be used for approving burial sites for normal (non-emergency) carcass disposal?

No, the Iowa DNR burial map is intended mainly for selection of sites used for emergency burial of large quantities of carcasses that could pose environmental hazards. Though not required, poultry and livestock producers may find the burial zones map helpful in selecting appropriate sites for routine (non-emergency) burial of carcasses on their property.

What are the rules governing burial depth?

Iowa DNR burial rules currently require carcasses to be covered with at least 30 inches of soil and to be buried no more than 6 feet below ground and at least 2 feet above the water table. IDALS rules require that animals that have died of non-communicable diseases be buried 6 feet below ground surface.

## What are the set-back requirements for on-farm burial of livestock or poultry?

Iowa DNR rules require that carcasses be buried:

- (1) At least 100 feet from any private and 200 feet from any public well which is being used or would be used without major renovation for domestic purposes.
- (2) At least 50 feet from adjacent property line.
- (3) At least 500 feet from an existing neighboring residence.
- (4) More than 100 feet from any body of surface water such as a stream, lake, pond, or intermittent stream.

## **Incineration**

### What are the regulations regarding equipment that can be used for incineration of routine mortalities?

Regulations require any carcass incineration to be done using engineered incinerators equipped with afterburners or other approved devices that limit smoke emissions sufficiently to meet opacity limits set by Iowa DNR. Open burning or use of home-made incinerators is prohibited.

### Do incinerators used for routine disposal of poultry or livestock mortalities require an air quality permit similar to those issued for commercial or industrial incinerators?

Incinerators used by farm operations do not require a permit from the Iowa DNR. All carcass incinerators must, however, be operated according to manufacturers directions and, as noted above, must meet emission opacity limits set by the Iowa DNR.

### Can open pyre incineration be used for emergency disposal of carcasses?

No. Due to its high potential for serious air pollution, open burning is prohibited for emergency disposal of carcasses.

### Are incinerators designed for routine mortality disposal suitable for emergency disposal?

Incinerators used for routine mortality disposal are generally sized to handle normal daily losses and would typically have insufficient capacity for emergency disposal of a whole herd or flock. Overloading of low capacity incinerators may result in incomplete combustion and release of smoke, odors, and live disease agents.

## **Composting**

### Is a solid waste disposal permit, like those required by industrial composting operations, necessary for on-farm composting of mortalities.

Farmers who wish to compost routine livestock mortalities originating from one or more sites that they own or operate may do so without obtaining a permit from Iowa DNR.

Changes in Iowa's composting regulations that were approved by the Iowa Environmental Protection Commission in the spring of 2006 allow farmers with multi-site operations to

transport mortalities to a central composting facility located on one of their sites without having to obtain a solid waste composting permit.

Businesses or individuals that are neither the owner nor operator of any of the sites where dead farm animals are generated, and that want to compost dead farm animals, must obtain a permit in accordance with Iowa DNR solid waste composting rules.

### Do mortality composting operations release offensive odors?

With proper pile construction and maintenance, odorous gases produced during carcass decay are retained within the composting pile and are broken down by microbial activity. For carcasses composted in open (unsheltered from rain) windrows, an 18 to 24-inch thick envelope of ground cornstalks, ground hay, silage, or similar material should be maintained over the carcasses to absorb and retain odorous gases.

The extra thick envelope of cover material recommended for unsheltered piles facilitates temporary storage and subsequent evaporation of excess precipitation, thereby reducing odors caused by pile saturation. For carcasses composted in sheltered bins, 6-12 inches of cover material can be used because rainfall is excluded and bin walls help to retain the cover material over the carcasses as decomposition and settling occur.

### Is it necessary to turn the pile during mortality composting? If so, when should it be turned? Are there situations when turning is NOT recommended?

Turning generally accelerates carcass decay, but it is not essential. During three years of field research on emergency cattle disposal methods, researchers at Iowa State University composted 54 tons of 1,000-lb cattle carcasses in untuned windrows. The purpose of these tests was to evaluate composting techniques that reduce the likelihood of releasing airborne pathogens. During these tests, cattle carcasses were generally decomposed (with exception of skeletal remains) within 8-12 months during cool/cold weather, and in 5-7 months during warm weather.

To achieve the most rapid decay, mortalities should be turned as soon as internal temperature measurements begin to trend downward. Turning will introduce more oxygen, and redistribute moisture thereby stimulating microbial activity and a return to higher temperatures. Turning frequency will vary with the size of the carcasses and with external air temperatures. During warm weather, poultry and small pigs (less than 25 lbs) are typically turned every two weeks if bin space is limited and minimum composting times are desired. Pigs weighing 25-100 lbs might typically be turned once every 4-6 weeks. Larger carcasses take considerably longer to break down, and turning too soon may expose odorous materials. In general, allow pigs and cattle weighing over 100 lbs at least 8-12 weeks before the initial turning...longer during cold weather. Be sure to have additional cover material available to control odors that will be emitted when compost containing partially decomposed carcasses is turned.

During cold weather excessive turning can lead to undesirable heat loss resulting in slow decay.

Livestock mortalities caused by contagious disease should not be turned until they are fully decayed. Turning too early in the decay process can release foul odors.

### Are scavengers a problem around mortality composting facilities?

Mortality composting bins or windrows that are not covered with a sufficiently thick envelope of sawdust, ground cornstalks, or similar cover material may attract insects, rodents, or larger scavengers. Unwanted intrusions can be reduced or eliminated through: strategic location of composting operations (away from sites known to harbor scavengers); use of composting bins which make intrusion more difficult; application of an extra thick layer of cover material to reduce accessibility and odor releases; and occasional inspection and maintenance to insure that carcasses remained covered as decomposition occurs and piles settle.

### How much cover material is needed?

This depends on the type of cover material used (readily degradable materials, such as silage, require more), frequency of turning (increased turning will increase need for supplemental cover), type of composting facility used (bins typically require less cover than open windrows), and the extent to which you chose to recycle cover materials.

For swine carcasses composted in bins using sawdust or small woodchips, experience suggests that roughly 7-8 cubic yards of cover material are needed for each 1,000 lbs of carcasses composted. Using finished compost to cover new carcasses can reduce this amount somewhat, but producers are advised not to recycle the material more than once as this ultimately reduces the carbon-to-nitrogen ratio of the compost and may result in poor bacterial growth and slow degradation.

For mature (1,000 lb) cattle composted in open windrows, ISU field trials required approximately 12 cubic yards of cover material to adequately cover each 1,000 lbs of carcass weight composted. At cover material densities typical in newly constructed piles, this is approximately equivalent to 1 ton of ground straw or hay, 1.4 tons of ground cornstalks, or 3.2 tons of corn silage.

### Is it necessary to have a roof or cover over mortality composting piles?

For permanent composting operations intended for use during rainy seasons, roofed facilities greatly reduce the risks of odor production and slow decomposition caused by pile saturation. For short-term composting operations, a tarp can provide rain protection, but keeping tarps in place during windy weather can be difficult. During livestock disposal emergencies or other situations where construction of roofed facilities is considered impractical, application of an extra thick (24 inches or more) layer of absorbent cover material can temporarily store excess moisture that will subsequently be evaporated by heat and air movement through the compost pile. Repeated wetting and drying of certain types of cover materials, particularly sawdust, also can lead to formation of a natural surface crust that helps to shed excess precipitation.

### Will I need to add water?

Each 1000 pounds of fresh livestock or poultry carcasses contains about 700 pounds of water that will be released during composting. So in humid climates like Iowa's that average 30 inches



of precipitation per year, water addition is rarely necessary. In drier climates, however, water addition may be necessary, particularly if compost piles are turned frequently.

### What is the fertilizer value of composted mortalities?

The percentage of nitrogen, phosphorus, and potassium contained in mortality compost varies greatly depending on the type and quantity of cover material used. Samples of cattle mortality compost from ISU research trials have typically contained roughly 1/2 % (wet basis) of total N and P. Use of cover materials such as poultry litter that typically have higher N and P values will result in better nutrient values in the finished mortality compost.

### What kinds of co-compost materials can be used?

Sawdust has long been considered to be the best cover material due to its absorbency, porosity, and ability to retain heat. Unfortunately sawdust and similar wood byproducts are not readily available throughout Iowa and competitive uses for these materials have driven their cost up. Alternative cover materials that work reasonably well include: ground cornstalks, ground straw, and poultry barn litter (sawdust containing moderate amounts of turkey or broiler droppings). ISU cattle composting research also has produced reasonably good results with a thin (6-9 inch) layer of semi dry cattle feedlot manure placed directly over the carcasses and an additional 18 inch thick external envelope of ground cornstalks.

### Are bones a problem in the finished mortality compost?

In general on-farm mortality composting operations that are not turned a great deal will contain un-decomposed bones that are dry, sometimes brittle, and free of marrow and other soft tissues. For poultry and small- to medium-sized swine, these bones generally do not attract insects or predators or interfere with crop production. Larger carcasses from swine breeding stock or mature cattle can contain some very large bones or skulls that have considerable strength and are not broken up by typical dry manure spreading equipment and may interfere with subsequent planting operations. Use of dry manure spreaders equipped with a hammer-mill type discharge has been effective in breaking large bones into smaller fist-sized pieces that are less likely to interfere with future land uses. Screening and burial of large bones, or subjecting them to additional composting to further break them down, are other options.

### Is it practical to start a mortality composting operation during the winter?

This will depend on the size of the pile and the condition of the carcasses. Large piles generally produce and retain enough heat to allow microbial decomposition of carcasses to occur. Small piles (base dimensions less than 10 feet and height less than 5 feet), which produce and retain relatively little heat, are likely to be unsuccessful during cold weather. It is very important that carcasses NOT be allowed to freeze prior to composting as large quantities of insufficient heat is likely to be produced to thaw the carcasses out.

How can I estimate the size and number of bins, and cover material quantities, needed to compost the normal daily mortalities on my swine operation?

As a rule of thumb, a total of about 40 cubic feet of bin space is suggested for each pound of average daily loss in swine operations. For additional guidelines on selecting the size and number of bins, see ISU Extension publication PM 1917 *Composting Swine Mortalities in Iowa*. This bulletin can be downloaded from the "More Resources" section of the ISU Swine Mortality Composting Site at: <http://www.abe.iastate.edu/pigsgone/> (this file also included on ISU Poultry/Livestock Mortality Disposal CD)

How can I estimate the length and area of windrows, and quantity of cover material, needed for emergency disposal of the cattle or swine in my operation in the event of disease or other emergencies?

Roughly 150 square feet of land area is suggested for each ton of carcasses composted in emergency windrows. For further information on windrow dimensions and cover material quantities, see *Draft Guidelines for Emergency Composting of Cattle Mortalities* (can be downloaded from the Emergency Livestock Mortality Composting project website at [www.abe.iastate.edu/cattlecomposting/](http://www.abe.iastate.edu/cattlecomposting/) ). (also contained on ISU Poultry/Livestock Mortality Disposal CD) Although these guidelines were initially developed based on ISU cattle mortality composting research sponsored by the Iowa Department of Natural Resources, similar procedures would be applicable for emergency disposal of large quantities of smaller species.

## For Additional Information

Where can I get further details on poultry and livestock disposal in Iowa?

Two state agencies provide assistance on poultry and livestock disposal:

- The Animal Industry Bureau of the Iowa Department of Agriculture & Land Stewardship handles animal health and disease control issues through enforcement of rules located in the Iowa Administrative Code (IAC) Section 21- Chapter 61. **Animal disposal questions can be directed to the Animal Industry Bureau at: 515/281-8601**
- The Iowa Department of Natural Resources enforces regulations designed to prevent adverse environmental impacts (air and water quality pollution) caused by animal carcass disposal. Burial rules are found in IAC 567-100.4(2)b, and carcass composting rules are stated in 567-105.6. **The 24-hour emergency contact phone number for Iowa DNR is :515/281-8694.**

Where can I view current versions of the Iowa Administrative Code sections noted above?

The most recent version of the IAC is available on the Iowa Legislature - General Assembly website. Direct links to the pertinent chapters are given below. (NOTE: For the convenience of users who do not have a high speed internet connection, the 2004 versions of these code sections also are included on this CD and can be accessed separately by clicking on their file names or by using the local links included in this document.)

## Web Links

### **Iowa Department of Agriculture and Land Stewardship (State Veterinarian)**

IDALS IAC 21-61 <http://www.legis.state.ia.us/Rules/Current/iac/021iac/2161/2161.pdf>

### **Iowa Department of Natural Resources**

*Burial* - Iowa DNR IAC 567-100

<http://www.legis.state.ia.us/Rules/Current/iac/567iac/567100/567100.pdf>

specifically section 100.4(2) b & c for environmental rules on burial and required separation distances.

*Composting* – Iowa DNR IAC 567-105

<http://www.legis.state.ia.us/Rules/Current/iac/567iac/567105/567105.pdf>

specifically section 105.6 for rules on composting dead farm animals

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